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EXAMINER

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ART UNIT PAPER NUMBER

2123

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17

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/268,999

Applicant(s)

ARITA, YUICHI

Examiner

Kandasamy Thangavelu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2003 and 19 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-25, 27 and 28 is/are rejected.
- 7) ☒ Claim(s) 10, 11 and 26 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 12 February 2003 is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Introduction

1. This communication is in response to the Applicant's Amendments, mailed on February 12, 2003 and May 19, 2003. Claims 1, 7, 9-11, 13 and 22-28 were amended. Claims 1-28 are pending.

Response to Arguments

2. Applicant's arguments filed on February 12, 2003 and May 19, 2003 with respect to claim rejections under 35 U.S.C. 112 first paragraph, 35 U.S.C. 112 second paragraph and under 35 U.S.C. 103 (a) have been fully considered. The claim rejections under 35 U.S.C. 112 first paragraph and second paragraph are withdrawn in response to the amendment dated May 19, 2003. However, the arguments with respect to claim rejections under 35 U.S.C. 103 (a) are not persuasive. Additional claim rejections are included in this office action. This office action is made non-final in response to the applicant's request for continued examination.

Drawings

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3. The applicant's proposed changes to the Figures 11 and 12 submitted on February 12, 2003 are accepted. The applicant is requested to send final corrected drawings for Figures 11 and 12.

Claim Objections

4. The following is a quotation of 37 C.F.R § 1.75 (d)(1):

The claim or claims must conform to the invention as set forth in the remainder of the specification and terms and phrases in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description.

5. Claim 1 is objected to because of the following informalities:

In amendment dated February 12, 2003, Claim 1, Para 4, Line 1, "working for the standard part models" appears to be incorrect and appears that it should be "working of the standard part models".

In amendment dated February 12, 2003 Claim 9, Line 4, "working for the standard part models" appears to be incorrect and appears that it should be "working of the standard part models".

In amendment dated February 12, 2003 Claim 9, Para 4, Line 1, "working for the standard part models" appears to be incorrect and appears that it should be "working of the standard part models".

In amendment dated February 12, 2003, Claim 10, Line 4, "working for the standard part models" appears to be incorrect and appears that it should be "working of the standard part models".

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In amendment dated February 12, 2003, Claim 10, Para 4, Line 1, "working for the standard part models" appears to be incorrect and appears that it should be "working of the standard part models".

Amended Claim 24, Line 10, "working model" appears to be incorrect and appears that it should be "working means model".

Amended Claim 24, Line 10, "component model" appears to be incorrect and appears that it should be "standard part model".

Amended Claim 26, Line 4, "working model" appears to be incorrect and appears that it should be "working means model".

Amended Claim 26, Line 4, "can approach the mating with the standard part model" appears to be incorrect.

Amended Claim 26, Line 6, "main model" appears to be incorrect and appears that it should be "design model".

Amended Claim 28, Line 3, "main model" appears to be incorrect and appears that it should be "design model".

Appropriate corrections are requested.

Claim Interpretations

6. The claims are interpreted using the following interpretations of the claim language:

Amended Claim 1, Para 4, Line 1, "working for the standard part models" has been interpreted as "working of the standard part models".

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Amended Claim 9, Line 4, “working for the standard part models” has been interpreted as “working of the standard part models”.

Amended Claim 9, Para 4, Line 1, “working for the standard part models” has been interpreted as “working of the standard part models”.

Amended Claim 10, Line 4, “working for the standard part models” has been interpreted as “working of the standard part models”.

Amended Claim 10, Para 4, Line 1, “working for the standard part models” has been interpreted as “working of the standard part models”.

Amended Claim 24, Line 10, “working model” has been interpreted as “working means model”.

Amended Claim 24, Line 10, “component model” has been interpreted as “standard part model”.

Amended Claim 26, Line 4, “working model” has been interpreted as “working means model”.

Amended Claim 26, Line 4, “can approach the mating with the standard part model” has been interpreted as “can approach the standard part model”.

Amended Claim 26, Line 6, “main model” has been interpreted as “design model”.

Amended Claim 28, Line 3, “main model” has been interpreted as “design model”.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 1-5, 7, 8, 9, 12-18, 21-24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Siddique (SI)** (Thesis to The Academic faculty for Master of Science in Mechanical Engineering, Georgia Institute of Technology, May 1996) in view of **Goto et al. (GO)** (U.S. Patent 5,075,866).

9.1 **SI** teaches Conversion of CAD model data for virtual prototypes for disassembly. Specifically, as per Claim 1, **SI** teaches a simulation apparatus for simulating based on design information of a design model designed in a virtual three-dimensional space (Fig. 6.6; Page 122, Sec. 6.2.3);

working of a working means model to be used for the one or more standard part models arranged in the design model (Fig. 6.6; Page 122, Sec. 6.2.3); comprising:

a working means model information storage section for storing working means model information which indicates details of the working means model to be used in working on the one or more standard part models (Page 117- Page120, Para 2); the working means model

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information being linked with standard part model information which indicates details of the one or more standard part models (Page 128, Fig. 6.9);

a working means model information extraction section for automatically referring, based on information regarding the standard part models arranged in a design model, to the working means model information storage section to extract information regarding a working means model to be used to work the standard part models arranged in the design model (Page 128, Fig. 6.9; Page 130, Fig. 6.11); and

a working simulation execution section for executing a simulation of the working [for] of the standard part models with the working means model based on design information of the design model and the information regarding the working means model extracted by the working means model information extraction section (Fig. 6.6; Page 122, Sec. 6.2.3).

SI does not expressly teach that one or more standard part models standardized in advance based on a specification model are arranged in the design model. **GO** teaches that one or more standard part models standardized in advance based on a specification model are arranged in the design model (Fig.2; Fig. 14; Col 4, Lines 24-28; and Col 4, Lines 37-49), as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus (Col 1, Lines 11-15). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation apparatus of **SI** with the CAD automatic design apparatus of **GO** that included one or more standard part models standardized in advance based on a specification model arranged in the design model, as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus.

9.2 As per Claim 2, **SI** and **GO** teach the simulation apparatus of Claim 1. **SI** also teaches that the information regarding the standard part models arranged in the design model include attribute information of the working means model related to the standard part models, and the working means model information extraction section refers to the working means model information storage section based on the attribute information to extract the information regarding the working means model (Page 128, Fig. 6.9; Page 130, Fig. 6.11).

9.3 As per Claim 3, **SI** and **GO** teach the simulation apparatus of Claim 1. **SI** also teaches that the working means model information storage section stores information of one or more tool models which are models of actual tools and/or a hand model which is a model of a hand of a worker as the information regarding the working means model (Page 117- Page120, Para 2).

9.4 As per Claim 4, **SI** and **GO** teach the simulation apparatus of Claim 1. **SI** also teaches that the information regarding the working means model stored in the working means model information storage section includes reference position information of the working means model when the working means model works the standard part models (Page 117, Para 2; Page 118, Para 2; Page 119 and 120); and

the working simulation execution section performs a simulation of a relationship in position/posture of the working means model to the standard part models based on the reference position information of the working means model and the standard part models (Fig. 6.6; Page 122, Sec. 6.2.3).

SI does not expressly teach that the design information of the design model includes reference position information of the standard part models when the working means model works the standard part models. **GO** teaches the design information of the design model includes reference position information of the standard part models when the working means model works the standard part models (Fig. 16D, S144; Col 5, Lines 17-27; Col 5, Lines 29-32; Col 5, Lines 34-36), as the linkage model contains the relationship between the design model and the standard parts (Col 5, Lines 19-27). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation apparatus of **SI** with the simulation apparatus of **GO** that included the design information of the design model including reference position information of the standard part models when the working means model works the standard part models, as the linkage model would contain the relationship between the design model and the standard parts.

9.5 As per Claim 5, **SI** and **GO** teach the simulation apparatus of Claim 1. **SI** also teaches the simulation apparatus comprising an interference checking section for checking interference of the working means model (Page 123, Sec. 6.2.4; Page 124, Fig. 6.7 and Para 2) while the working simulation execution section executes a simulation of the standard part models working with the working means model (Page 122, Fig. 6.6).

9.6 As per Claim 7, **SI** and **GO** teach the simulation apparatus of Claim 2. **SI** also teaches the simulation apparatus comprising a workability evaluation section for evaluating workability based on a result of execution of the working simulation by the working simulation execution

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section and also based on information of the attribute of the working means model, where the workability indicates whether or an extent to which the working means model is able to work the one or more standard part models (Page 122, Section 6.2.3).

9.7 As per Claim 8, **SI** and **GO** teach the simulation apparatus of Claim 2. **SI** also teaches that the working means model information storage section stores information regarding a working condition necessary for working for the working means model as information regarding the working means model (Page 117, Para 2, Lines 6-10; Page 118, Sec. 6.2.2; Page 119, Para 1); and

the working simulation execution section executes a working simulation based on the information regarding the working condition of the corresponding working means model stored in the working means model information storage section (Page 120, Para 2 & 3).

9.8 As per Claim 9, **SI** teaches a simulation apparatus for simulating based on design information of a design model designed in a virtual three-dimensional space (Fig. 6.6; Page 122, Sec. 6.2.3);

working for the standard part models arranged in the design model (Fig. 6.6; Page 122, Sec. 6.2.3); comprising:

a working means model information storage section for storing working means model information which indicates details of the working means model to be used in working on the one or more standard part models (Page 117- Page120, Para 2); the working means model

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information being linked with standard part model information which indicates details of the one or more standard part models (Page 128, Fig. 6.9);

a working means model information extraction section for automatically referring, based on information regarding the standard part models arranged in a design model, to the working means model information storage section to extract information regarding a working means model to be used to work the standard part models arranged in the design model (Page 128, Fig. 6.9; Page 130, Fig. 6.11);

a working simulation execution section for executing a simulation of the working [for] of the standard part models with the working means model based on design information of the design model and the information regarding the working means model extracted by the working means model information extraction section (Fig. 6.6; Page 122, Sec. 6.2.3);

the working means model information storage section stores information regarding a working condition necessary for working for the working means model as information regarding the working means model (Page 117, Para 2, Lines 6-10; Page 118, Sec. 6.2.2; Page 119, Para 1);

the working simulation execution section executes a working simulation based on the information regarding the working condition of the corresponding working means model stored in the working means model information storage section (Page 120, Para 2 & 3);

the working means model information storage section stores information regarding working spaces necessary for working with the working means model as the information regarding the working conditions of the individual working means model (Fig. 6.6; Page 122,

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Sec. 6.2.3); the simulation computes the accessibility and relative difficulty of fastening using the working spaces information.

SI does not expressly teach that one or more standard part models standardized in advance based on a specification model are arranged in the design model. **GO** teaches that one or more standard part models standardized in advance based on a specification model are arranged in the design model (Fig.2; Fig. 14; Col 4, Lines 24-28; and Col 4, Lines 37-49), as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus (Col 1, Lines 11-15). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation apparatus of **SI** with the CAD automatic design apparatus of **GO** that included one or more standard part models standardized in advance based on a specification model arranged in the design model, as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus.

9.9 As per Claim 12, **SI** and **GO** teach the simulation apparatus of Claim 1. **SI** does not expressly teach that at least one of a fastening part model, an adjustment part model and a connector part model is used for the standard part models. **GO** teaches that at least one of a fastening part model, an adjustment part model and a connector part model is used for the standard part models (Fig.6A; Fig. 6B; Col 6, Lines 35-42), as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus (Col 1, Lines 11-15). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation apparatus of **SI** with the CAD

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automatic design apparatus of **GO** that included at least one of a fastening part model, an adjustment part model and a connector part model used for the standard part models, as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus.

9.10 As per Claim 13, **SI** teaches a simulation method for simulating, based on data regarding a design model displayed in a virtual three-dimensional space and designed (Fig. 6.6; Page 122, Sec. 6.2.3); and

a simulation method for simulating workability according to a working means model used to work the standard part models arranged in the design model (Fig. 6.6; Page 122, Sec. 6.2.3); comprising:

providing working means model information, which indicates details of a working means model to be used in working on the one or more standard part models (Page 117- Page120, Para 2);

the working means model information being linked with standard part model information (Page 128, Fig. 6.9);

automatically acquiring the working means model, which is to be used in working on the individual standard part model, based on the working means model information linked with the standard part model information that indicates the details of the last-named individual standard part model (Page 128, Fig. 6.9; Page 130, Fig. 6.11); and

executing a simulation of working to be performed for the standard part models using the acquired working means model and displaying a process of the execution of the simulation in a virtual three-dimensional space (Fig. 6.6; Page 122, Sec. 6.2.3).

SI does not expressly teach the method comprising one or more standard part models standardized in advance based on a specification model arranged in the design model and providing standard part model information, which indicates details of the one or more standard part models. **GO** teaches the method comprising one or more standard part models standardized in advance based on a specification model are arranged in the design model and providing standard part model information, which indicates details of the one or more standard part models (Fig.2; Fig. 14; Col 4, Lines 24-28 and Col 4, Lines 37-49), as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus (Col 1, Lines 11-15). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation method of **SI** with the CAD automatic design method of **GO** that included the method comprising one or more standard part models standardized in advance based on a specification model arranged in the design model and providing standard part model information, which indicates details of the one or more standard part models, as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus.

9.11 As per Claim 14, **SI** and **GO** teach the simulation method of Claim 13. **SI** also teaches that as the simulation of the working to be performed for the standard part models, a simulation of at least one kind of working from among assembling working, disassembling working,

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adjustment working and maintenance working for the standard part models is performed (Fig. 6.6; Page 122, Section 6.2.3).

9.12 As per Claim 15, **SI** and **GO** teach the simulation method of Claim 13. **SI** also teaches that where a tool is used to work the standard part models, the tool and a hand of a worker who uses the tool are used as the working means model to perform the simulation of the working (Page 117- Page120, Para 2).

9.13 As per Claim 16, **SI** and **GO** teach the simulation method of Claim 13. **SI** also teaches that where the standard part models are to be worked by a hand of a worker itself, the hand of the worker is used as the working means model to perform the simulation of the working (Page 142, Fig. 7.6, Items 4, 5, 9, 10, 11, 12 etc.).

9.14 As per Claim 17, **SI** and **GO** teach the simulation method of Claim 15. **SI** also teaches that when the process of execution of the simulation of the working is displayed in the virtual three-dimensional space, the working means model is displayed in a shape suitable for an object of use in the virtual three-dimensional space (Page 122, Fig. 6.6 and Sec 6.2.3).

9.15 As per Claim 18, **SI** and **GO** teach the simulation method of Claim 16. **SI** also teaches that when the process of execution of the simulation of the working is displayed in the virtual three-dimensional space, the working means model is displayed in a shape suitable for an object of use in the virtual three-dimensional space (Page 122, Fig. 6.6 and Sec 6.2.3).

9.16 As per Claim 21, **SI** and **GO** teach the simulation method of Claim 13. **SI** also teaches that when interference occurs with the working means model in a process of execution of the working to be performed for the standard part models with the working means model, an occurrence condition of the interference is displayed (Page 123-125, Sec 6.2.4 and Fig. 6.7).

9.17 As per Claim 22, **SI** teaches a computer-readable recording medium having a simulation program recorded thereon for causing, in order to cause a computer to execute, based on design information of a design model designed in a virtual three-dimensional space, a simulation of working with a working means model used to work the standard part models arranged in the design model (Fig. 6.6; Page 122, Sec. 6.2.3); the computer to implement:

a function of providing working means model information, which indicates details of a working means model to be used in working on the one or more standard part models (Page 117-Page 120, Para 2);

the working means model information being linked with standard part model information (Page 128, Fig. 6.9);

a function of automatically acquiring the working means model information, which is to be linked with the working means model to be used in working on the individual standard part models used upon designing of a design model (Page 128, Fig. 6.9; Page 130, Fig. 6.11); and

a function of executing a simulation of working to be performed for the standard part models based on the acquired information of the working means model and a function of

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displaying a process of the execution of the simulation in a virtual three-dimensional space (Fig. 6.6; Page 122, Sec. 6.2.3).

SI does not expressly teach one or more standard part models are arranged in the design model and a function of providing standard part model information, which indicates details of the one or more standard part models. **GO** teaches one or more standard part models are arranged in the design model and a function of providing standard part model information, which indicates details of the one or more standard part models (Fig.2; Fig. 14; Col 4, Lines 24-28 and Col 4, Lines 37-49), as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus (Col 1, Lines 11-15). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the computer-readable recording medium having a simulation program recorded thereon of **SI** with the computer-readable recording medium having a simulation program recorded thereon of **GO** that provided for one or more standard part models arranged in the design model and a function of providing standard part model information, which indicates details of the one or more standard part models, as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus.

9.18 As per Claim 23, **SI** teaches designing supporting apparatus, comprising

the designing supporting section including an attribute information extraction section for referring to the standard part model information storage section to automatically extract attribute information of a working means model to be used to work the standard part models arranged in

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the subject designed in the virtual three-dimensional space (Page 128, Fig. 6.9; Page 130, Fig. 6.11);

a design data outputting section for outputting data regarding the subject designed in the virtual three-dimensional space and data regarding the attribute information extracted by the attribute information extraction section as design data (Page 128, Fig. 6.9); and

the attribute information including working means model information, which indicates details of a working means model to be used in working on the one or more standard part models and which is linked with the standard part model information (Page 128, Fig. 6.9; Page 130, Fig. 6.11).

SI does not expressly teach a standard part model information storage section for storing standard part model information regarding one or more standard part models standardized in advance based on a predetermined specification model; and a designing supporting section for arranging one or more standard part models to perform supporting for designing a subject in a virtual three-dimensional space. **GO** teaches a standard part model information storage section for storing standard part model information regarding one or more standard part models standardized in advance based on a predetermined specification model (Fig.3A; Col 4, Lines 23-50 and Col 5, Lines 19-22); and a designing supporting section for arranging one or more standard part models to perform supporting for designing a subject in a virtual three-dimensional space (Col 1, Lines 10-13), as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus (Col 1, Lines 11-15). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the designing supporting apparatus of **SI** with the designing supporting apparatus of

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GO that included a standard part model information storage section for storing standard part model information regarding one or more standard part models standardized in advance based on a predetermined specification model; and a designing supporting section for arranging one or more standard part models to perform supporting for designing a subject in a virtual three-dimensional space, as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus.

9.19 As per Claim 24, **SI** teaches an apparatus for simulating work upon a model, comprising:
a working means model, separate from the design model, of a type generally capable of mating with the standard part model, and having working requirements information for working the standard part model in a virtual three-dimensional space when mated with the standard part model (Page 117- Page120, Para 2);

arrangement information describing an arrangement of the working means model when it is arranged to be mated with the standard part model (Page 128, Fig. 6.9; Page 130, Fig. 6.11);
and

a processing unit automatically determining whether or an extent to which the arranged working means model can work the [component] standard part model according to the arrangement information, the working requirements of the working means model and according to the design model (Fig. 6.6; Page 122, Sec. 6.2.3).

SI does not expressly teach a design model comprised of a standard part model. **GO** teaches a design model comprised of a standard part model (Fig.3A; Col 4, Lines 23-50 and Col 5, Lines 19-22), as standard parts are commercially available and widely used and their models

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are readily available in the CAD automatic design apparatus (Col 1, Lines 11-15). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the apparatus of **SI** with the apparatus of **GO** that included a design model comprised of a standard part model, as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus.

9.20 As per Claim 27, **SI** teaches a method for simulating, comprising:

arranging a working means model into a working arrangement (Page 128, Fig. 6.9; Page 130, Fig. 6.11); and

automatically determining whether or an extent to which the working means model, as arranged in its working arrangement, can work, in virtual three-dimensional space, the standard part model, by using the design model and working requirements of the working means model to automatically simulate the working means model working the standard part model (Fig. 6.6; Page 122, Sec. 6.2.3).

SI does not expressly teach an arrangement of a standard part model that is part of a design model. **GO** teaches an arrangement of a standard part model that is part of a design model (Fig.3A; Col 4, Lines 23-50 and Col 5, Lines 19-22), as standard parts are commercially available and widely used and their models are readily available in the CAD automatic design apparatus (Col 1, Lines 11-15). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the method of **SI** with the method of **GO** that included an arrangement of a standard part model that is part of a design model, as standard parts

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are commercially available and widely used and their models are readily available in the CAD automatic design apparatus.

10. Claims 6, 19, 20, 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Siddque (SI)** (Thesis for Master of Science, submitted to Georgia Tech, 1995) in view of **Goto et al. (GO)** (U.S. Patent 5,075,866), and further in view of **Hirata et al. (HR)** (U.S. Patent 6,157,902).

10.1 As per Claim 6, **SI** and **GO** teach the simulation apparatus of Claim 5. **SI** also teaches that that the interference checking section checks interference of the working means model when the standard part model arranged in the design model is worked using the working means model (Page 123, Sec. 6.2.4; Page 124, Fig. 6.7 and Para 2).

SI and **GO** do not expressly teach that the interference checking section checks interference of the working means model including a route along which the working means model arrives at one of the standard part models when the standard part model arranged in the design model is worked using the working means model. **HR** teaches that that the interference checking section checks interference of a part in disassembly/assembly and remaining parts including a route along which the part arrives at other parts (Col 1, Lines 10-21; Col 2, Lines 23-36), as that would provide an automatic assembly/disassembly route producing system capable of simulating whether a designed product can actually be assembled or disassembled without actually manufacturing the product (Col 1, Lines 42-45). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation apparatus of

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SI and **GO** with the simulation apparatus of **HR** that included the interference checking section checking interference of a part in disassembly/assembly and remaining parts including a route along which the part arrives at other parts, and substituting for the part the working means model and for other part the standard part model, as that would provide an automatic assembly/disassembly route producing system capable of simulating whether a designed product can actually be assembled or disassembled without actually manufacturing the product.

10.2 As per Claim 19, **SI** and **GO** teach the simulation method of Claim 13. **SI** teaches that a manner of working performed based on a condition defined in advance for the working means model is displayed as the process of execution of the simulation of the working (Page 120, Para 2 & 3; Fig 6.6).

SI and **GO** do not expressly teach that a process through which the working means model arrives at one of the standard part models which provides a subject position is displayed as the process of execution of the simulation of the working. **HR** teaches that a process through which the working means model arrives at one of the standard part models which provides a subject position is displayed as the process of execution of the simulation of the working (Col 1, Lines 10-17; Col 2 Lines 53-56; Col 13, Line 64 to Col 14, Line 4 and Col 16, Line 3-7), as that would provide an automatic assembly/disassembly route producing system capable of simulating whether a designed product can actually be assembled or disassembled without actually manufacturing the product (Col 1, Lines 42-45). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation method of **SI** and **GO** with the simulation method of **HR** that provided for a process through which the working

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means model arrived at one of the standard part models which provided a subject position being displayed as the process of execution of the simulation of the working, as that would provide an automatic assembly/disassembly route producing system capable of simulating whether a designed product could actually be assembled or disassembled without actually manufacturing the product.

10.3 As per Claim 20, **SI**, **GO** and **HR** teach the simulation method of Claim 19. **SI** and **GO** do not expressly teach that after the working performed based on the condition defined in advance for the working means model is completed, a process through which the working means model is spaced away from the subject position based on a condition defined in advance for the standard part models is displayed. **HR** teaches that after the working performed based on the condition defined in advance for the working means model is completed, a process through which the working means model is spaced away from the subject position based on a condition defined in advance for the standard part models is displayed (Col 2, Lines 61-67; Col 16, Line 3-7), as as per **SI**, from the simulation, the accessibility and relative difficulty of unfastening (fastening) can be determined by the designer (Page 123, Para 1). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation method of **SI** and **GO** with the simulation method of **HR** that provided for after the working performed based on the condition defined in advance for the working means model was completed, a process through which the working means model was spaced away from the subject position based on a condition defined in advance for the standard part models was displayed, as

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as per **SI**, from the simulation, the accessibility and relative difficulty of unfastening (fastening) could be determined by the designer.

SI and **GO** do not expressly teach that after the working means model is spaced by a predefined distance away from the subject position, the display of the working means model or the working means model and the standard part models is erased. **HR** teaches that after the working means model is spaced by a predefined distance away from the subject position, the display of the working means model or the working means model and the standard part models is erased (Col 2, Lines 61-67; Col 16, Line 3-7), as as per **SI**, from the simulation, the accessibility and relative difficulty of unfastening (fastening) can be determined by the designer (Page 123, Para 1). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the simulation method of **SI** and **GO** with the simulation method of **HR** that provided for after the working means model was spaced by a predefined distance away from the subject position, the display of the working means model or the working means model and the standard part models was erased, as as per **SI**, from the simulation, the accessibility and relative difficulty of unfastening (fastening) could be determined by the designer.

10.4 As per Claim 25, **SI** and **GO** teach the apparatus of Claim 24. **SI** and **GO** do not expressly teach that the processing unit also automatically determines whether the working means model can be routed through the virtual three-dimensional space to its mated arrangement without interference between the moving working means model and the design model. **HR** teaches that the processing unit also automatically determines whether the working means model can be routed through the virtual three-dimensional space to its mated arrangement without

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interference between the moving working means model and the design model (Col 1, Lines 10-21; Col 2, Lines 23-36), as that would provide an automatic assembly/disassembly route producing system capable of simulating whether a designed product can actually be assembled or disassembled without actually manufacturing the product (Col 1, Lines 42-45). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to modify the apparatus of **SI** and **GO** with the apparatus of **HR** that included the processing unit automatically determining whether the working means model could be routed through the virtual three-dimensional space to its mated arrangement without interference between the moving working means model and the design model, as that would provide an automatic assembly/disassembly route producing system capable of simulating whether a designed product could actually be assembled or disassembled without actually manufacturing the product.

10.5 As per Claim 28, **SI** and **GO** teach the method of Claim 27. **SI** and **GO** do not expressly teach determining whether a route of movement of the working means model to the arrangement with the standard part model can be performed without interference between the [main] design model and the working means model. **HR** teaches determining whether a route of movement of the working means model to the arrangement with the standard part model can be performed without interference between the [main] design model and the working means model (Col 1, Lines 10-21; Col 2, Lines 23-36), as that would provide an automatic assembly/disassembly route producing system capable of simulating whether a designed product can actually be assembled or disassembled without actually manufacturing the product (Col 1, Lines 42-45). It would have been obvious to one of ordinary skill in the art at the time of Applicant's invention to

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modify the method of **SI** and **GO** with the method of **HR** that included determining whether a route of movement of the working means model to the arrangement with the standard part model can be performed without interference between the [main] design model and the working means model, as that would provide an automatic assembly/disassembly route producing system capable of simulating whether a designed product could actually be assembled or disassembled without actually manufacturing the product.

Allowable Subject Matter

11. Claim 10 would be allowable if the claim objections in Paragraph 5 are overcome.
12. Claim 11 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
13. Claim 26 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims and if the claim objections in Paragraph 5 are overcome.

Applicant's Arguments

14. The applicant argues the following:

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(1) the specification explains how workability is evaluated (discrete workability of reaching the part and non-discrete range of movement at the part), based on the simulation and based on the workability coefficient;

(2) the main model corresponds to the design model of the specification; the workable component model corresponds to a standard part model and the working means model corresponds to the working model;

(3) one of ordinary skill in the art would readily understand that workability can relate to whether the working means can be worked into the position of the part model, and can also relate to whether and to what extent the working means can operate through a range of movement;

(4) an aspect of the presently claimed invention is to simulate the working of a working means model (e.g. tool or hand) to be used for the one or more standard part models arranged in the design model;

(5) working means model information extraction section refers to said working means model information storage section based on the attribute information of the part, to extract information regarding the working means model; and

(6) generally, even if the claims are rejected under 112 first paragraph, their patentability with respect to the prior art must be determined by the examiner; when the degree of uncertainty of the claims is not great, the examiner is to choose an interpretation and analyze the claims under the prior art based on that interpretation.

Examiner's reply

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15. As per the applicant's arguments, the applicant's attention is requested to the corresponding claim rejections. In addition, the following explanation is provided to further explain the examiner's position.

15.1 In response to the applicant's argument that "the specification explains how workability is evaluated (discrete workability of reaching the part and non-discrete range of movement at the part), based on the simulation and based on the workability coefficient", the examiner and the applicant's attorney have discussed the issue during the telephone interview on May 5, 2003. The examiner pointed out to the attorney that the specification does not describe the evaluation of the workability coefficient and the attorney proposed to amend the claim in a supplemental amendment.

15.2 In response to the applicant's argument that "the main model corresponds to the design model of the specification; the workable component model corresponds to a standard part model and the working means model corresponds to the working model", the examiner and the applicant's attorney have discussed the issue during the telephone interview on May 5, 2003. The examiner pointed out to the attorney that the specification does not describe the main model, workable component model and the working model and the attorney proposed to amend the claim in a supplemental amendment using terms used in other claims.

15.3 In response to the applicant's argument that "one of ordinary skill in the art would readily understand that workability can relate to whether the working means can be worked into the

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position of the part model, and can also relate to whether and to what extent the working means can operate through a range of movement”, the examiner and the applicant’s attorney have discussed the issue during the telephone interview on May 5, 2003. The examiner pointed out to the attorney that the specification does not describe workability and the attorney proposed to amend the claim in a supplemental amendment using terms readily understood by one of ordinary skill in the art.

15.4 In response to the applicant’s argument that “an aspect of the presently claimed invention is to simulate the working of a working means model (e.g. tool or hand) to be used for the one or more standard part models arranged in the design model”, the examiner has pointed out that the reference **SI** teaches simulating the working of a working means model (e.g. tool or hand) to be used for the one or more standard part models arranged in the design model (Fig. 6.6; Page 122, Section 6.2.3).

15.5 In response to the applicant’s argument that “working means model information extraction section refers to said working means model information storage section based on the attribute information of the part, to extract information regarding the working means model”, the examiner respectfully disagrees. The working means model information extraction section uses the attribute information to select the appropriate tool (Page 129, Para 2).

15.6 In response to the applicant’s argument that “generally, even if the claims are rejected under 112 first paragraph, their patentability with respect to the prior art must be determined by

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the examiner; when the degree of uncertainty of the claims is not great, the examiner is to choose an interpretation and analyze the claims under the prior art based on that interpretation", the examiner and the applicant's attorney have discussed the issue during the telephone interview on May 5, 2003. The examiner pointed out to the attorney that the terms used in claims 24-28 are subject to wide interpretations making it impossible to determine their patentability with respect to the prior. The attorney proposed to amend the claim in a supplemental amendment.

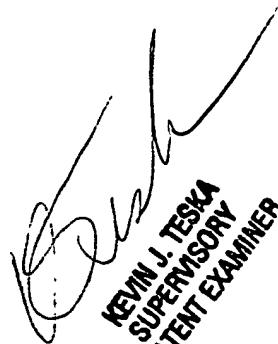
Conclusion

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 703-305-0043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska, can be reached on (703) 305-9704. The fax phone number for the organization where this application or proceeding is assigned is 703-746-7329.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-9600.

K. Thangavelu
Art Unit 2123
May 31, 2003



KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER